

CLAIMS

We claim:

1. An apparatus for delivering a self expanding stent into a body lumen comprising:

5 an outer tube having a proximal end and a distal end and sized to hold a self-expanding stent therein in a radially constricted condition;

an inner tube within said outer tube having a proximal end and a distal end;

10 a capturing element comprising a foldable sleeve slidably engaged with said inner tube, said sleeve having a proximal end and a distal end, said proximal end being smaller than said outer tube and said distal end being larger than said outer tube, said capturing element carried on said inner tube such that said distal end of said sleeve can extend beyond said distal end of said outer tube in an unfolded condition and said sleeve can be drawn into and become folded within said outer tube when said inner tube is drawn proximally relative to said outer tube, whereby a stent having an end
15 inserted into said distal end of said sleeve is drawn into said outer tube, thereby becoming captured in a radially constricted condition within said outer tube; and

20 a blocking element fixed to said inner tube near said distal end of said inner tube and adapted to block a stent inserted into said sleeve from becoming situated proximally of said blocking element and to block said capturing element from becoming situated distally of a predetermined point relative to said inner tube.

2. The apparatus of claim 1 wherein said blocking element comprises a band fixed to said inner tube.

3. The apparatus of claim 1 wherein said capturing element further comprises a carriage to which the proximal end of said sleeve is fixedly attached, said carriage at least substantially circumscribing said inner tube so as to be slidable longitudinally on said inner tube.

4. The apparatus of claim 3 wherein said carriage is adapted to engage said outer tube so as to resist distal movement of said capturing element relative to said outer tube to a greater extent than it resists proximal motion of said capturing element relative to said outer tube.

5. The apparatus of claim 4 wherein said carriage comprises a leaf spring extending from said carriage obliquely distally and into engagement with said outer tube, whereby said spring resists distal motion of said carriage relative to said outer tube to a greater extent than it resists proximal motion of said carriage relative to said outer tube.

6. The apparatus of claim 4 wherein said carriage has an outer barbed surface adapted to engage said outer tube and resist distal motion of said carriage

relative to said outer tube to a greater extent than it resists proximal motion of said carriage relative to said outer tube.

7. The apparatus of claim 1 wherein said sleeve is funnel shaped.

8. The apparatus of claim 7 wherein said sleeve is conical.

5 9. The apparatus of claim 1 wherein said distal end of said inner tube extends beyond said blocking element, whereby a stent inserted into said sleeve is captured between said inner tube and said outer tube.

10 10. The apparatus of claim 1 wherein said inner tube does not extent distally of said ~~capturing~~ blocking element.

JPN 12.12.01
KLa 12.12.01
CC 12.14.01

11. The apparatus of claim 1 wherein said sleeve is formed of a thin plastic film.

12. The apparatus of claim 1 wherein said stent is a stent-graft.

13. The apparatus of claim 1 wherein said stent is a covered stent.

14. The apparatus of claim 1 wherein said capturing element includes apertures for allowing fluids introduced between said outer tube and said inner tube to flow between said proximal end of said outer tube and said distal end of said outer tube.

5 15. A method of loading a stent into a stent delivery apparatus, said apparatus comprising an outer tube sized to hold a self-expanding stent therein in a radially constricted condition, said outer tube having a proximal end and a distal end, an inner tube within said outer tube, said inner tube having a proximal end and a distal end, a capturing element slidably mounted on said inner tube and comprising a foldable sleeve having a proximal end and a distal end, said proximal end being smaller than said outer tube and said distal end being larger than said outer tube, said capturing element carried on said inner tube such that said distal end of said sleeve can extend beyond said distal end of said outer tube in an unfolded condition and said sleeve can be drawn into and become folded within said outer tube when said inner tube is drawn proximally relative to said outer tube and a blocking element fixed to said inner tube near said distal end of said inner tube and adapted to block a stent inserted into said sleeve from becoming situated proximally of said blocking element and to block said capturing element from becoming situated distally of a predetermined point relative to said inner tube, said method comprising the steps of:

20 (1) positioning said inner tube such that said distal end of said capturing element extends beyond said distal end of said outer tube;

(2) inserting an end of a stent into said distal end of said sleeve; and

(3) drawing said inner tube proximally relative to said outer tube so as to draw said sleeve and said stent into said outer tube, thereby capturing said sleeve and said stent in said outer tube in a radially constricted condition.

5 16. A method of deploying in a body lumen a stent loaded into a stent delivery apparatus in accordance with claim 15 comprising the steps of:

 (4) after step (3), inserting said delivery apparatus into a body lumen to position said distal end of said outer tube adjacent a stent deployment site; and

 (5) after step (4), drawing said outer tube proximally relative to said inner tube
10 and said stent so as to release said stent from its radially constricted condition.

 17. The method of claim 15 wherein step (2) comprises inserting said stent into said sleeve until an end of said stent abuts said blocking element.

 18. The method of claim 17 wherein, in step (5), said blocking element blocks said stent from being drawn along with said outer tube.

15 19. The method of claim 18 wherein said blocking element comprises a band fixedly attached to said inner tube distally of said proximal end of said sleeve and wherein said capturing element is slidably engaged with said inner tube and wherein, in step (5), said sleeve is drawn along with said outer tube.

20. The method of claim 19 wherein said capturing element further comprises a carriage to which the proximal end of said sleeve is fixedly attached, said carriage circumscribing and frictionally engaging said inner tube so as to be slidable relative to said inner tube upon application of force and wherein an outer surface of said carriage
5 is adapted to engage said outer tube such that said capturing element does not move distally relative to said outer tube when said inner tube is moved distally relative to said outer tube, and wherein, in step (5), said sleeve is drawn along with said outer tube due said engagement with said outer tube.

21. The method of claim 19 wherein said distal end of said inner tube extends
10 beyond said blocking element, whereby, in step (3), said stent is captured between said inner tube and said sleeve.